Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	**)**	
	)	
Sixth Further Notice of Proposed	**)**	**WP Docket 07-100**
Rulemaking – 4.9 GHz Band	**)**	
	)	

Joint Comments of the
Telecommunications Subcommittee of the American Petroleum Institute
and the Regulatory and Technology Committee of the
Energy Telecommunications and Electrical Association

The Telecommunications Subcommittee of the American Petroleum Institute ("API") and the Regulatory and Technology and Technology Committee of the Energy Telecommunications and Electrical Association ("ENTELEC") jointly submit these comments in response to the Federal Communications Commission's 6th Notice of Proposed Rulemaking ("NPRM") for alternatives to expand the use and investment in the 4.9 GHz ("4.9") proceeding.[1]

Background

API is a national trade association representing more than 625 companies involved in all phases of the petroleum and natural gas industries, including exploration, production, refining, marketing and transportation of petroleum, petroleum products and natural gas. Among its many activities, API acts on behalf of its members before federal and state regulatory agencies. The API Telecommunications Subcommittee evaluates and develops responses to state and federal proposals affecting telecommunications facilities used in the oil and gas industries. API is supported and sustained by companies that make use of a wide variety of wireline, wireless and satellite communications services on both a private and commercial basis. All wireless services used by our membership require RF spectrum resources, of both narrowband and broadband varieties.

ENTELEC is a user association focusing on communications and control technologies used by petroleum, natural gas, pipeline and electric utility companies. The Regulatory and Technology Committee is comprised of ENTELEC's members and provides policy advocacy and targeted educational opportunities and resources on behalf of those members.

[1] *In re Promoting Investment in the 3550-3700 MHz Band*, Notice of Proposed Rulemaking and Order Terminating Petitions, FCC 17-134 (*rel*. Oct. 24, 2017).

As such, our membership overwhelmingly feels the 4.9 GHz band offers the Commission a great opportunity to provide broadband spectrum that is needed by critical infrastructure and new technology interests. As such ENTELEC and API are optimistic that the Commission will remain true to this band throughout the NPRM process, instead of recent trends to allocate broadband spectrum favorable to mostly larger wireless carriers interests.

Comments

Our comments in response to the NPRM focus on the Commission's proposed changes as suggested by the NPSTC Plan and APCO report ("NPSTC plan"). We wish to offer an alternative perspective on several proposed changes that, if adopted, will significantly improve the utility of the 4.9 GHz band for critical infrastructure companies, who like public safety, have an important need for broadband spectrum.

Below, we address several specific proposals that were included in the NPRM:

1) Band Plan. API and ENTELEC strongly agree with the NPSTC plan that spectrum should be allocated for the following use cases (collectively termed "ADR"):

   a) Manned Aerial Systems ("Aerial")
   b) Unmanned Aerial Systems ("Drones")
   c) Robotic Systems ("Robotics")

   API and ENTELEC propose taking the NPSTC suggestion of a single 5 MHz channel further, as we feel NPSTC underestimates the growth of Drone and Robotic use cases and the technical challenges of RF interference, especially with the Drone and Aerial use case in large open areas. Interference can be mitigated more easily with a larger channel pool. Thus, we believe that 20 MHz should be considered the ADR use cases and termed the "ADR band". The remaining 30 MHz of the 4.9 GHz band that remains for other use cases, would be termed the "Remaining" band.

   Our recommendation would be that the ADR band consist of channels 1-5 and 14-18, remaining as 1 MHz channels, plus channels 6 and 13 remaining as 5 MHz channels. These channels would be reserved for ADR uses. This would afford flexibility in channel use and size, as purely regular video offering could utilize a 1 MHz channel whereas larger throughput requirements could be met with the 5 MHz block.

   Any incumbent Public Safety use would need to be located in the Remaining Band, in order to afford them protection as primary users.

2) Aggregation Limits. While API and ENTELEC are not against Regional Plan Committees (RPCs) limit of 20 MHz for aggregation, there is a need to segment the aggregation limit due to our proposed band plan. We would be supportive of two separate limits within the ADR band:

   a) Aggregation of the 1 MHz wide channels of up to 5 MHz total

b) Aggregation of the 5 MHz wide channels 6 and 13 together (total of 10 MHz) within the ADR band

For the Remaining Band spectrum containing channels 7-12, we would support a limit of up to 30 MHz total. Note that if the aggregation limit was reduced to 15 MHz, there could co-exist (2) 15 MHz aggregate channels (Channels 7-8-9, and 10-11-12) in the spectrum. While a 15 MHz profile is not supported in many systems, it is a channel width defined for Long-Term Evolution (LTE). This may want to be considered by the Commission.

3) Aerial Height Limit. Since Drones have a limit of 400 feet above ground level ("AGL") under FAA part 107, API and ENTELEC believe that the Drone use case should have the same limit in terms of 4.9 GHz operation. For other Aerial vehicles, we agree with the 1500-foot AGL limit as proposed for all channels within the ADR band. This 1500-foot limit would also apply to Drones under the FCC rules, if an FAA waiver for higher operation for a Drone has been granted.

4) Coordination. API and ENTELEC do not believe that formal coordination for the ADR band should be required. It would be impractical as much as it would only be of limited help, given the sporadic nature of Aerial and Drone operations, or the somewhat confined area use for Robotics. Therefore, we feel the Commission should waive this requirement in the ADR band. However, in the Remaining band, we would support coordination per the NPSTC plan.

5) Border Coordination. API and ENTELEC seek an exemption from the 160-km coordination or usage restriction along the border with Mexico in the Gulf of Mexico for ADR usage. Such exemption would require that if interference is reported, that a good faith interference reduction plan be agreed upon by both parties, or the operation of 4.9 GHz at both facilities must cease.

Realize that propagation conditions within the Gulf of Mexico certainly will exceed the -114 dBW/m2 criteria for Drone or Aerial uses. However, given the remoteness of the Gulf of Mexico, the chances for there to be a bona-fide issue are not very great. However, it may occur. A bi-lateral notification requirement would serve to generate cooperation. Thus, if two relatively close assets on opposite sides of the border create interference for each other, it would be better to require operations adjustments to minimize this impact first, rather than to have restrictions to ready use of the band in that area due to a resolvable issue.

6) ADR band EIRP Limit. API and ENTELEC are in support of low power operations for the ADR band, but find that the power output limit should be increased from 14 dBm/5 MHz to 14 dBm/1 MHz. There should also be no directional antenna requirement. Obviously using a directional antenna to increase the EIRP to a higher value as not limited by the rules would be necessary for higher altitude or longer distance communications. However, simple systems at short ranges would not require overcomplicated antenna designs and could be compliant very easily.

7) Remaining Band EIRP Limit. API and ENTELEC support transmitter output for short and long-range point-to-point or point-to-multipoint transmissions. We feel that the minimum antenna gain requirements should align with the communications distance sought, to maximize channel re-use. We would like to suggest a two-tiered approach to enable both short and longer links:

   a) For links of less than 8 km, a minimum antenna gain of 21 dBi with a corresponding maximum EIRP of 40 dBm. A 25 dB minimum front-to-back requirement is also recommended.

   b) For links of greater than 8 km, a minimum antenna gain of 26 dBi with a corresponding maximum EIRP of 60 dBm. A 25 dB minimum front-to-back requirement is also recommended.

   c) For a multipoint link of less than 8 km where the subscriber station wishes to use an omnidirectional antenna, the maximum EIRP should be limited to 27 dBm.

8) Polarization. API and ENTELEC support the Commission's suggestion that polarization requirements not be addressed in the rules. Given the advancements in Multiple-in, Multiple-Out (MIMO) technologies, plus the Drone and Aerial use cases affecting linear polarization purity, such a recommendation would be either limiting or impractical.

9) CII Status. API and ENTELEC urge the Commission offer Critical Infrastructure (CII) entities co-primary status within the Remaining band. Such status should not be tied to offering "public safety services", since by their nature the operations of CII entities, including Oil, Gas, Utility, and Railroads, make them nearly as important.

10) Buildout Requirements. API and ENTELEC agree that a buildout requirement in the Remaining band of 12 month is sufficient to ensure that licensing is properly utilized.

11) Leasing. API and ENTELEC do not believe in a leasing model with public safety serving as spectrum "landlords". We believe that the Commission best performs that function as the primary issuer of spectrum, even if it is on a secondary basis.

Conclusion

API and ENTELEC firmly believe that the 4.9 GHz band if enabled with an eye towards the future, can support both upcoming needs in Drones and Robotics, as well as licensed spectrum for critical data links that would otherwise be unreliable. We hope the Commission will consider our suggestions, as we feel that the technical viability of 4.9 GHz for interests outside of the larger wireless carriers is key to its success.